

Appl. No. 09/651,140
Amdt. Dated 03/01/2004
Reply to Office Action of 09/29/2003

IN THE SPECIFICATION

Please amend the Specification as follows:

Page 14, line 1, please amend the paragraph starting there-at and continuing through to page 15, line 21 into three paragraphs as follows:

"Additional communication channels can be readily added to the fiber optic module 100. PCB 106 may be enlarged along with the ground plane 114 to include additional transmit or receive communication channels, each channel having a separate transmitter 111 or receiver 110 with the shielded housing 119 encompassing all high frequency electrical components of the communication channels to provide EMI shielding. To reduce the size of the PCB 106 or to incorporate more functions on the PCB 106, a multi-channel IC may also be employed instead of discrete ICs for each communication channel. The number of male electrical connectors 113 and 117 may be reduced to make the electrical interface more compact. For instance, only one male electrical connector 113 and one male electrical connector 117 may be employed. Furthermore, male electrical connector 113 and male electrical connector 117 may be combined into one male electrical connector. Also, the grouping of multiple transmit or receive communication channels on a PCB 106 allows the use of a common power supply for those transmit or receive communication channels. Thus, the module may be further simplified, reduced in size, and made less expensive to manufacture. Furthermore, multiple fiber optic modules 100 may be designed to plug in side by side to form a single fiber optic module having additional communication channels.

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Thus, by grouping four transmit communication channels on a PCB 106 a four channel transmitter may be assembled. Likewise, by grouping four receive communication channels on a PCB 106 a four channel receiver may be assembled. By grouping four transmit communication channels and four receive communication channels on a PCB 106 ~~an eight~~ a four channel transceiver may be assembled. Eight channel, ten [[Ten]] channel, twelve channel, sixteen channel, twenty-four channel, thirty-two channel and other sizes of transmitters, receivers and transceivers are thus possible.

Referring now to Figure 2, a simplified cross - sectional view of an optical subassembly 103' of the fiber optic element 103 is illustrated. Optical element 103 has at least one optical subassembly 103'. The optical subassembly 103' includes an optical block 120 and fiber ferules 131. The optical block 120 includes a lens 123 and a lens 121 for coupling light or photons into or out of the fiber optic cable 101. Lens 123 and 121 may be spherical lenses or each may be a pair of aspheric lenses on the same optical axis. Light or photons emitted by a transmitter 110 are collected and focused by lens 123 into a transmit fiber optic cable. Light or photons on a receive fiber optic cable are collected and focused by lens 121 into a receiver 111."

Page 16, line 20, please amend the paragraph starting there-at and continuing through to page 17, line 13 as follows:

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"Referring now to Figure 3, an exploded view of the optical subassembly 103' of the preferred embodiment of the present invention is illustrated. The optical subassembly 103' ~~include~~ includes a nose 151, fiber ferules 131, an alignment plate 153, which also helps shield EMI from leaking into or out of the module, and the optical block 120. The optical block 120 aligns transmitters 110 or receivers 111 with its internal lenses 121 and 123. Alignment plate 153 has projections 156 which engage external notches 157 of the optical block near its edges. The projections couple into the external notches 157 so optical ports 159 of the alignment plate 153 align with the optical ports 129 and 130 of the nose 151. Alignment plate 153 is coupled to shielded housing 119 via projections 156 and shunts electromagnetic fields to shielded housing 119. The fiber ferules 131 can be inserted into the optical ports 129 and 130 upon assembly. Nose 151 further has one or more posts 164 over which one or more holes 158 in the EMI shield 153 can slide in order to align the nose 151, fiber ferules 131, the EMI shield 153 and the optical block 120 together."

Page 17, line 14, please amend the paragraph starting there-at as follows:

"Note that more than two channels can be formed in parallel together by providing additional optical subassemblies 103' and electrical elements 104 with

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additional components, or by expanding the [[dual] dual channel optical block to four channel, eight channel, ten channel, twelve channel optical blocks or more. Depending on the number of channels thus created, different configurations of fiber optic cables 101 may be employed. For example, for a four channel assembly two duplex LC fiber optic cables, four LC cables, four bundled LC cables or one four channel parallel ribbon with fan out LC connectors may be employed."

Page 26, line 23, please amend the paragraph starting there-at and continuing through to page 27, line 13 into two paragraphs as follows:

"In operation, electromagnetic fields may radiate to the EMI shield 153, the shielded housing 119, the ground plane 114 of the fiber optic module 100 as well as the module cage 170 and shields of the female electrical connectors 181 and 182.

Electromagnetic fields radiating to the module cage 170 are shunted through the chassis ground. Similarly, electromagnetic fields that radiate to [[,]] or that are shunted to [[,]] the shielded housing 119 are shunted to ground via the guide rail 162, the surface of the guide rail slot 171, and then via the chassis ground. The signal ground is connected to the male electrical connectors 113 and 117, and female electrical connectors 181 and 182. When plugged in, the signal ground is first connected to avoid any damage to the module before the signal is connected. In this way, the module can be hot-plugged in and out without introducing any damage to the module and the system."

Docket No: 003918.P002XX1

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